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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER

JUBA JR, JOHN

ART UNIT PAPER NUMBER

2872

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/432,112

Applicant(s)

TSUDA ET AL.

Examiner

John Juba, Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 3, 15, 63, and 64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 15, 63 and 64 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 November 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "determining unit" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. As further set forth below, the introduction of a "determining unit" in itself appears to be new matter. However, to the extent that the new matter rejection below may be overcome, then the drawings are deficient as to illustration of the subject matter now claimed.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 1 – 3, 15, 63, and 64 are objected to because of the following informalities. Appropriate correction is required:

In claim 1, at (e), it is believed that “determining whether a specific one of the optical fiber types exists in the optical transmission line” should read “determining *where* a specific one of the optical fiber types exists in the optical transmission line”. As recited at (a), the claim requires that “a plurality of fiber types” exist in the transmission line. Thus, each and every “one of the optical fiber types” previously recited (line 11) is [inherently] present.

Claims 2, 3, 63, and 64 are objected to as inheriting the same informality through their dependency from claim 1.

Similarly, in claim 15 (line 11), it is believed that “determining whether” should read “determining where”. Each of the fiber types is already recited as being present. Thus, a means of determining “whether” one of the types is present would be superfluous.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which

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was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As amended, claim 15 recites "a determining unit determining whether a specific one of the optical fiber types exists in the optical transmission line". However, there appears to be no disclosure in the original specification, claims, or drawings of such a "determining unit". As such, the recitation of a "determining unit" constitutes new matter.

Claim 15 is further rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

There is no disclosure of what manner of measurement, supervisory signaling, or data input is contemplated as facilitating the determination, by a "unit", rather than by personnel, that a certain fiber type is present. For example, are means to be provided for measuring the index distribution across a fiber cross-section? And, if so, how would such measuring means be interposed in the transmission line, without completely disrupting communications? Alternatively, if the "unit" is to make a determination based upon dispersion at some point in the transmission line, what means would be required to advise the "unit" of the remaining parameters necessary to draw a conclusion as to fiber type?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 3, 15, 63, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy, et al (U.S. Patent number 5,559,920), in view of Delavaux, et al (U.S. Patent number 5,608,562) and Kosaka, et al (U.S. Patent number 6,195,480). Beginning with claim 15, and referring *for example* to the discussion of Figure 1, Chraplyvy, et al disclose a system for optical transmission adopting dispersion compensation comprising

an optical fiber transmission line composed of a plurality of segments (12)(14)(16) each having a length falling within a “predetermined” range, said plurality of segments including a plurality of fiber types (single mode fiber, dispersion compensating fiber, and even dispersion shifted fiber; Col. 7, lines 9 – 17);

an optical transmitter (6) supplying an optical signal to said optical fiber transmission line from one end thereof;

an optical receiver (7) receiving said optical signal from the other end of said optical fiber transmission line;

an optical amplifier (17)(18) provided between two adjacent segments (12)(14); and

a dispersion compensating unit (13) provided in at least one (the amplifier) of said optical transmitter, optical receiver, and optical amplifier.

The provision of amplifiers between fiber segments clearly conveys to the artisan that the segment lengths are limited in accordance with the available gain, the loss budget, and the noise budget. To one having ordinary skill in the art, Chraplyvy, et al fairly disclose segment lengths selected from a "predetermined" range, determined in advance, whereby these parameters have values consonant with an operative channel. Thus, Chraplyvy, et al disclose the invention substantially as claimed. However, Chraplyvy, et al do not disclose the dispersion compensator as providing a dispersion selected from a plurality of stepwise varying dispersions determined according to said predetermined range, and do not disclose a determining unit.

In the same field of endeavor, Delavaux, et al disclose a system for optical transmission adopting dispersion compensation, the system comprising an optical fiber transmission line with a plurality of segments; an optical transmitter, and optical receiver, optical amplifiers provided between adjacent segments of the fiber transmission line, and optical dispersion compensators provided at various locations in the system, the dispersion compensators providing a dispersion selected from a plurality of stepwise varying dispersions determined according to a range of fiber lengths. Delavaux, et al teach that provision of adjustability in the compensators permits the compensators to be used with a variety of fiber types and fiber lengths (Col. 2, lines 10 – 13). Delavaux, et al note that the most rudimentary method and system of dispersion compensation is one wherein the appropriate degree of compensation is

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determined by personnel (Col. 3, lines 62 – 65), but suggest instead, a fully automated system wherein a controller (35) makes the determination as to the appropriate amount of dispersion compensation in accordance with the fiber parameters (dispersion, length, loss; Col. 3, lines 65+). In the illustrated embodiment (Fig. 4) the variable dispersion compensators are applied at each amplifier, but Delavaux, et al teach that dispersion compensation can also be applied at the transmitter or receiver (Col. 4, lines 57+).

In the system of Chraplyvy, et al where compensation is applied with spooled lengths of dispersion compensating fibers, it would have been obvious to replace the fixed compensators with variable compensators under the direction of a controller, in the interest of automating compensation of the system, and in the interest of extending the compensation method to a system having a variety of segment lengths and fiber types, as suggested by Delavaux, et al. One of ordinary skill would have appreciated the rather obvious advantages attendant automation of the dispersion compensators, such as permitting real-time adjustment of the network parameters without the need to deploy personnel to each location having a compensator.

Thus, Chraplyvy, et al and Delavaux, et al suggest the invention substantially as claimed, but do not disclose the controller as being a “determining unit” determining whether a specific fiber type exists at a given location and whether a dispersion compensator need be included at a specific location in consideration of the parameters recited. Nonetheless, where the system of Chraplyvy, et al includes spans which are dispersion equalized and/or spans which are dispersion shifted (as they suggest), the examiner believes that the controllers suggested by Delavaux, et al would have, at the

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appropriate locations, determined that the amount of dispersion compensation to be inserted would be zero. In such instances, the examiner can think of nothing more obvious than omitting a dispersion compensator at a location where no compensation was required. As such, it is believed that each of the controllers suggested by Delavaux, et al would have acted as a "determining unit" in the manner recited. Further, in the same field of endeavor, Kosaka, et al disclose a system for optical transmission adopting dispersion compensation, the system comprising an optical fiber transmission line with a plurality of segments, an optical transmitter, and optical receiver, optical amplifiers provided between adjacent segments of the fiber transmission line, and optical dispersion compensators provided at various locations in the system. Kosaka, et al expressly teach that when the characteristics of the transmission paths exert no influence on the transmission characteristic, a dispersion compensator may be omitted entirely (Col. 9, lines 47 – 52). Thus, it is believed that one of ordinary skill would have found it obvious to program the controllers of Delavaux, et al to advise of locations where the dispersion compensator was to be omitted entirely in accordance with the upstream and downstream dispersion, and in accordance with the fiber type connected at a given point in the system, such as in the case of the dispersion shifted spans suggested by Chraplyvy, et al.

With regard to method claims 1, *et seq.*, Chraplyvy, et al disclose the steps of providing the transmission line, providing an optical transmitter, providing an optical receiver, and providing an optical amplifier as recited, including the step of providing fixed compensators (spooled DCF), but do not disclose the step of determining whether

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a specific fiber type exists in the transmission line, and do not disclose the step of providing the stepwise dispersion compensator in response to the determination. Delavaux, et al suggest the step of providing compensators having stepwise varying dispersions in order to accommodate a variety of fiber types and lengths, and further teach providing a means to determine the types of fibers attached to the compensators (in accordance with the fiber parameters such as dispersion, length and attenuation). Kosaka, et al teach that it was well-known to omit a dispersion compensator where the attached span does not affect the overall dispersion (as would be understood to be the case where dispersion shifted spans or dispersion equalized spans are attached). Thus, it would have been obvious to one of ordinary skill to determine the locations at which the step-wise compensators are to be attached in accordance with whether a specific fiber type (such as dispersion shifted fiber) is present and in accordance with the upstream and downstream dispersion at each location, since Delavaux, et al clearly teach determining the amount of requisite compensation in this manner, and Kosaka, et al teach that a compensator can be omitted entirely in this manner.

With regard to claims 2, *et seq.*, Delavaux, et al are clearly referring to dispersion shifted fiber with a 1550 nm zero dispersion wavelength. It is believed that one of ordinary skill would have recognized that + 17 ps/nm-km dispersion of the other "transmission fiber" to be combined with the dispersion compensating fiber is the anomalous dispersion of a single mode fiber with a 1300 nm zero dispersion wavelength, when operated in the 1500 nm band.

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With regard to claims 3, 63, and 64, it is believed that one of ordinary skill would have arrived at the recited determinations and placements through only routine experimentation and optimization, in accordance with the combined teachings of the prior art.

Response to Amendment

Applicants' amendment is sufficient in overcoming the previous objection to claims 1 – 3 and 15. However, a new objection has been entered.

Applicants' amendment is sufficient in overcoming the previous rejection of claims 2 and 3 under 35 U.S.C. §112, second paragraph.

Applicants' amendment is sufficient in overcoming the rejection of claims 1 - 3 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by N. Henmi, et al., (IEEE Photonics Techn. Lett.). As previously indicated, Henmi, et al do not disclose a dispersion compensator of the type recited. As follows the "providing" step, claim 1 now requires "at least one dispersion compensator" that "provides a dispersion selected from a plurality of stepwise varying dispersions". Similarly, claim 15 now requires "at least one dispersion compensator" provided in "at least one of" several locations.

Conclusion

The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

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L.D. Garrett, et al (*ECOC '97*) disclose a network of mixed fiber type and experiment with the order of arrangement of the segments.

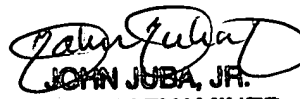
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (571) 272-2314. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Drew Dunn whose number is (571) 272-2312 and who can be reached on Mon.- Thu., 9 - 5.

The centralized fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for *all* communications.


JOHN JUBA, JR.
PRIMARY EXAMINER
Art Unit 2872

November 4, 2004